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ABSTRACT

This is the author's personal document in which he tries to simply see what learning is about. He draws heavily on Fritz Heider for his phenomenological analysis, by which he means an analysis of learning based solidly and integrally on what can be simply seen by all men. The paper distinguishes a learning process found in the developing child, called maturational learning, which is not found in the adult. In addition, it considers three learning processes common to children and adults: (1) learning to do things; (2) acquiring knowledge; and (3) learning to go along with people or in groups. The author concludes that, of the different learning processes which he discusses, social learning is by far the least clear perceptually, and the most mysterious conceptually. (TL)

FOUR TYPES OF LEARNING--A PHENOMENOLOGICAL ANALYSIS

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I. INTRODUCTION

The meaning of "learning" in its everyday use has been practically lost sight of in various theoretical psychological contexts. On the one hand it has been preempted by academic psychology to denote various mystical phenomena which are never met with in ongoing life and very dubiously, if at all, met with, as it is claimed, in a laboratory setting. On the other hand, the predominant spirit in contemporary clinical thinking based upon Freudian foundations is involved in Id psychology whereas "learning" refers basically to the realm of the Ego.

This gap between the prevalent scientific usage of the word and its common-sense meaning is disturbing -- especially to the intelligent layman when he seeks help for his problems. Among professionals a similar sense of disturbance has also been expressed. In academic psychology, in particular, many professionals have expressed disagreement with the over-simplified, all-too-reductive definition of "learning" entailed in almost every form of the so-called "learning theories." Years ago Tolman (8) protested against the treatment of learning as one simple process and pointed out that more than one type of learning can be discriminated. Others have followed his footsteps from time to time. By and large the critics have had little impact upon academic thinking and "learning theories," although they have changed with time in form and content, have really not changed in spirit. Perhaps this lack of impact was due to the fact that the critics were inherently too committed to the spirit of the theories they were criticizing to be effective. Essentially they were criticizing the periphery, not the core.

The root of the trouble, in my opinion, lies in the contemporary attitude prevailing among the sciences of man to reject common sense, even more

so, one seems to sense in them a tacit, and sometimes not so tacit, assumption that common sense is a priori wrong. Common sense, however, is the fundamental basis of all man's knowledge; and scientific knowledge, in order to make sense, must be integrally related to common sense. This does not preclude the fact that science does come up with knowledge showing that common sense is mistaken in specific areas, e.g., the world is seen as flat but science has shown us that it is round. But when science does so it must also explain why and where common sense was misled. Unless it can do this, its "explanations" are really not accepted as explanations, neither by the intelligent layman nor by the scientists themselves. Even if these scientific "explanations" have high predictive value, they still make no sense and constitute a modern form of mystery.

And this brings us to what I understand by "phenomenological analysis." Many people find it difficult to define "phenomenology." The difficulty lies in their attempt to define "phenomenology" substantively, in terms of the content subsumed under the word. The contents vary much-too-much to yield an acceptable definition. Matters are simplified if we look upon "phenomenology" as indicating a basic scientific attitude, a basic psychological predisposition. It seems to be correct to assert that, regardless of the specific context, whenever a scientist or philosopher uses "phenomenology" he attempts to base whatever he has to say solidly and integrally on the hard stubborn facts of the world as simply seen by man. And what is simply seen by one man can generally be simply seen by everyman. Phenomenological thinking in all its variations is irrevocably committed to the phenomenal world as a fundamental departure point; when all is said and done the phenomenal world is the real world and science must explain reality.

The following discussion of learning is essentially a personal document. I have tried to make sense to myself, to simply see what learning is about. But since I am a man, what makes sense to me should make sense to anyman. Hence, I take the liberty of writing down my inner discourse for public perusal. In much of my analysis I am heavily indebted to Fritz Heider, who was my teacher (4). He taught me how to look squarely at the phenomenal given. Recently upon reading Gilbert Ryle's "The Concept of Mind" (7) I discovered that his approach is quite harmonious with mine.

This paper will treat "learning" at a relatively low level of abstraction. It will focus on learning processes immediately abstracted from the phenomenal given, leaving open the more basic question of whether there is a unique process underlying all learning phenomena or not. It will distinguish a learning process found in the developing child to be called "maturational learning" which is not found in an adult. In addition, it will then consider three learning processes common to children and adults:

a. Learning to do things,

b. Acquiring knowledge,

c. Learning to get along with people or in groups.

The general concept of "learning," or of "the learning process" will be treated as an undefined primitive, an entity that is perceptually given. Those who claim that learning cannot be perceived will not be able to fully follow the discussion. They will be in a position analogous to a person blind from birth listening to a paper on color mixing. It is assumed that a large enough set of events is perceived by a large enough number of people as being "learning" to make the subsequent discussion potentially profitable. The fact that there probably also exists a large set of events which are perceptually

unclear, i.e., one cannot be sure whether they constitute "learning" or not, is immaterial for this discussion. One can hope that with increasing knowledge and the consequent refinement of instruments, tools, concepts, pointer readings, and other measurement devices, the members of the unclear set will be greatly reduced and possibly eliminated.

In discussing the different learning processes it will be necessary to specify what it is that characterizes the various instances of learning that are examples of a specific process and differentiates them from other instances of learning that are examples of other processes or that do not fit any of the discussed processes. This characterization will be made in terms of "low level" concepts which will be coordinated as much as possible to a unique perceptual given or to a set of perceptual givens which sort of intuitively hang together in a meaningful fashion. The fact that concepts exist which differentiate between processes does not imply that concepts common to the disparate processes do not exist. The mere usage of the general word "learning" denies such a implication. For the word "learning" to be used meaningfully in a technical sense, a set of instances must exist characterized by a common property or set of properties ("property" is here synonymous with "concept") on the basis of which they are differentiated from those instances that are not considered to be "learning." The learning processes discussed here constitute proper subsets of the more general "learning" set, each characterizable by an additional property or set of properties.

Although the learning processes should be both perceptually and conceptually distinguishable, they need not be mutually exclusive for a given instance of "learning." In fact, except under contrived conditions, it is probably rare to find a learning instance which is a pure example of one or the other processes.

An analogy: silver is a "pure" substance, a chemical element, yet it is very rarely, if ever, found in a pure state in nature. Pure silver is contrived by man in a factory or laboratory. The lack of mutual exclusiveness is not crucial unless the processes interact in a noticeable manner. There is no reason to believe that they do. Therefore, as far as this discussion is concerned, they will be considered to be additive in their effects and will be discussed independently despite the probability that for many specific learning instances, some aspects will belong to one process being considered whereas other aspects will belong to another process or processes.

For pragmatic reasons man has set up many contrived situations where these processes can be found in much greater purity, to a variable degree. Examples of such situations are educational institutions, training courses and/or programs and psychological laboratories. Much of the knowledge we have about the "learning processes" is obtained from our experience in these settings.

II. MATURATIONAL LEARNING

A child does not only grow, i.e., increase its physical mass becoming bigger and bigger, it matures as well. Maturation can be viewed in terms of a dichotomy found useful in abnormal psychology: organic as against functional. "Organic" refers to the physiological locus of behavior, i.e., an organic psychosis is a psychological state that can be related to a unique cerebral condition. "Functional" refers to behavior without any knowledge or interest in its underlying physiological locus; i.e., a functional psychosis is a psychological state whose underlying physiological locus is unknown. Hence, the investigator concentrates on its behavioral manifestations without considering problems of physiology. From an organic standpoint maturation refers to the development of organs and/or sundry physiological subsystems and the effect of this development upon the organism. Organs generally change from a passive to an active state with maturation. Physiological subsystems increase in differentiation and specialization with maturation. These changes affect organismic functioning at all levels in a non-additive manner. It does not seem proper to say that with a maturational change the organism has added some additional abilities to its previous repertoire; rather it seems more correct to say that with each maturational change the organism exhibits a reorganization of its abilities and that it functions in a new, more efficient way in all respects.

From the standpoint of trying to understand learning, the organic standpoint is not very important. This would be true even if the connection between physiology and behavior were known. This is even more true in the present state of our ignorance, where the little we think we know of this connection is very speculative. However, functional maturation exhibits patterns very similar to the physiological patterns thumb-nail-sketched above. Suddenly

what the child was unable to do or understand yesterday, it can do or understand today. And generally this ability is not a simple addition to the child's earlier repertoire, but also entails a reorganization of that repertoire.

Take walking as an example. Does the fact that the child takes a first step mean only that now the child's feet are strong enough to stand on one foot while moving the other forward? No! Walking entails a complete reorganization of balance which in turn entails a different body image; the head and hands have to be held differently. In addition, a whole new world becomes literally available with this dramatic change in mode and efficiency of locomotion and the organism must be ready to cope with this new world in all of its abilities. It is true that walking involves other learning processes as well, especially the process called "learning to do things," but the point made here is that even for the "first" step to take place, a reorganization of the other abilities of the child must also occur. The subsequent learning processes then build upon this reorganization rather than upon the new ability added to the old abilities.

Piaget (6) has studied the development of logical thinking in children and has demonstrated, to his satisfaction, a rather constant and interesting pattern. He argues that logical thinking emerges from non-logical thinking and then goes through a series of successive organizations characterized both by increased specialization and differentiation on one hand, and increased integration of the growing number of specialized and differentiated logical skills, on the other. Non-logical causality of the kindergarten child is characterized by mere contiguity of events imbued with animistic volition. With maturation the child begins to understand physical casuality of simple

events like pushing, weight, etc. Later these discrete causal events begin to be tied down into little groups based on common causal principles; or in Piaget's words, the child develops transformation rules which apply to a group of causal events. As the child grows older these transformations become more inclusive in a lawful manner and the number of groups decreases until, with the emergence of adult thinking, all causal principles are logically related by a set of transformations in one master group called a lattice. Piaget notes that the meaning of a causal principle or event changes with each change in transformation rules and change in group membership because the event now leads to a different set of conclusions and alternatives than it did earlier.

But it must be stressed that learning these principles and acquiring the use of transformation rules and logical lattices is not a simple function of maturation. While it is true that a child cannot learn a given set of transformations until it is ready to learn it, i.e., it is mature enough to learn it, mere readiness to learn does not result in learning. When it is ready to learn, it has to be taught. Although all normal children who live to adulthood pass the stage where their readiness to learn to read and write emerges, unless they go to school and are exposed to a rigorous didactic environment, they will most probably not acquire the skill.

Despite the fact that Piaget restricted his research to child solutions to logical problems and demonstrated that his formulations can account for the increasing efficiency and sophistication of growing children in solving such problems, his findings have wider implications. With each change in transformation rules leading to the inclusive lattice, the whole world of the child changes. Events are interrelated differently. The causal properties

are richer. Is it rash to believe that the appreciation of beauty, art, the adult sense of humor and of tragedy, so noticeably lacking in a child, is the result of a person living in a world that is causally connected and integrated into a rational, ergo meaningful, whole. Hughlings Jackson demonstrated long ago and Henry Head (3) and Kurt Goldstein (2), among others, have argued eloquently since, that brain injured patients who have lost the ability to think abstractly or categorically also lose an appreciation for art, lose their sense of humor and of tragedy.

Maturation is an unfolding of potentialities: virgin potentialities which have to be actualized in order not to atrophy. If a child is kept tied to a crib so that it cannot stand, it will suffer no harm as long as it cannot stand; but once it reaches a maturational state wherein it can stand, further restraint will definitely be harmful. After a given period of constraint its legs will atrophy and it will remain a cripple for life. To the extent that any potentiality of a maturing organism is atrophied, the organism is bound to function at a less efficient level than it could have and should have.

The organism seems to be aware of the danger of non-actualization of emerging potentialities. A child does not mind being tied down as long as it is not ready to stand, but once it is ready to stand, it is almost impossible to tie it down. Children of all ages demonstrate an "exploratory drive" far more intense than almost all adults. Is this "exploratory drive" anything more than their reaction to unfolding potentialities. Unactualized potentialities are virgin, unstructured, they cry for actualization, their actualization is a form of learning. They lap it up as dry land laps up water. Learning is very rapid and relatively permanent. There are many areas which are almost impossible for an adult to master, but are relatively easy for

a child; examples are: learning an instrument, a new language, a host of motor skills, and probably most important, a culture and set of basic attitudes and meanings from which the organism cannot free itself for the rest of its existence.

The adult has none of this. His potentialities have been unfolded. He has a fixed repertoire of adequately actualized potentialities, partially actualized potentialities, and atrophied potentialities. Most adults, with the exception of a small group of artists, gifted teachers, and some others who are characterized as being "wonderful with children," have even lost the ability to empathize with this fantastic, ever blossoming, ever mushrooming world of the child. They cannot understand that often the "perversity" of children is but an expression of this drive to actualize the potentialities as they unfold, that often the child's refusal to learn that which is offered him because of pragmatic considerations of a "curriculum" or "need to know" is due to the fact that perhaps at the same time something which the child really needs to learn, really needs to know, is being denied him. A child will often not refuse to eat food it does not need as long as it also gets food it does need, but if its diet is inadequate, it will eat the food mother gives it with protest and crying, and then go to look for limestone which will give it the calcium it craves.

III. LEARNING TO DO THINGS

The classical example for this type of learning process is the acquisition of motor skills. It is this process that seems to serve as the model for most, if not all, associationist and connectionist theories of learning. Some phenomenal characteristics describe it in a clear-cut manner. First there is the classical learning paradigm with its relatively many repetitions and its small increment increase in efficiency until a desired and/or maximum level of achievement is reached. In observing this process one can almost literally see the stamping in of correct responses and the stamping out of the incorrect ones. Concomitant with this increase in efficiency there is an increasing automatization of the performance accompanied by its recession from consciousness.

Take the learning to type as an example. At the outset the pressing of each key stands in the center of consciousness, often involving a volitional decision on the part of the person. Slowly the letters recede from consciousness to be replaced by words. These, in turn, are replaced by sentences and/or lines. And finally, the whole process becomes automatic, the expert typist paying little attention, if at all, to the skill being executed. These two sets of phenomena, the incremental learning curve and automatization accompanied by recession from consciousness, seem to be significata for a skill-learning process.

But certain additional things characterize skill-learning. From the standpoint of the goal-means dichotomy, skills are related to means rather than to goals. Once they are mastered, automatized, and have receded from consciousness, they are called forth when needed to achieve a certain task, to help in reaching a desired goal. When the task is accomplished they retire,

like good servants, not to be heard from again until needed. The products of this learning process emerge, after it has reached its optimum, as relatively finished abilities which, with appropriate practice, remain relatively unchanged and exist in relative isolation from the rest of the organism. At this point it is necessary to anticipate something to be discussed more fully in the next section. One should not confound the skill per se with the organism's knowledge of its skills. The latter always plays an important role in behavior, but it is distinctly different from the former.

Another interesting characteristic of learning to do things is its relationship with age and, consequently, with maturation. The younger a person is, the easier it is for him to learn new skills, that is, when he is mature enough and ready to master them. In fact, there are many skills that are masterable with ease, if at all, only during the maturational period. Language is a good example. Children can master a new language with ease; with adulthood, however, many persons lose the ability to acquire a new language. Learning to play an instrument seems to be another good example. It is as if the newly maturated potentiality is of unformed soft clay which will soon harden. While it is soft it is easily molded and structured by the use of fingers. As it hardens, molding increases in difficulty until eventually a hammer and chisel are needed to produce any change, if at all. But the analogy of clay is perhaps insufficient. The hardness of the clay is not affected by its form, i.e., whether it is a shapeless lump or an articulated structure. This does not seem to hold true for a potentiality which has been actualized. The greater the efficiency of skill reached during the "soft" period, the more it was learned and practiced, the more difficult it is to change as time goes by. Therefore, to continue in terms of analogy, once a potentiality is actualized by developing a set of skills, once it becomes an articulated

structure, it is more difficult to re-utilize it for a different set of skills than were it originally neglected and atrophied to a certain degree.

The discussion has, until now, restricted itself explicitly to motor skills, though some of the examples cited above are exceptions. Motor skills involve the use of muscles to effect some change in the physical environment. Does this mean that all skills are muscular? By no means. Motor skills were first focused upon because they are most open to immediate perception. Early in the discussion a criterion was suggested, that of incremental learning and automatization and recession from consciousness. By using this criterion "mental" skills can also be identified. Let language be considered again. True, language does have a motor aspect: speaking. But reading and listening do not seem to have any significant motor components -- they seem to have only "mental" components. Learning a language nevertheless fits the above criterion. The mastery of a language is a slow process characterized by small increments; this holds for the child as well as the adult. Once a word is mastered it recedes from consciousness. It automatically appears in use when necessary without the reader or speaker explicitly having to call it up. The acquisition of language also conforms to the other characteristics of skill learning. Vocabulary is learned more rapidly by children than by adults. Once a word is mastered it lies dormant, relatively isolated and unchanged until used. Words are means to achieve goals of expression and/or understanding, but they themselves play no part in setting goals up.

Rote learning, be it of nonsense syllables for the experimental psychologist, or or poetry to be recited next day for the English teacher, also shares the characteristics of skill learning. Other "mental" skills that will be discussed in some more detail below are skills in problem solving,

skills in interpersonal relations, and learning the multiplication table. None of these acquisitions involve the motoric as it is commonly understood, yet they all seem to share the properties which characterize the learning of skills.

Nevertheless, there seems to be a significant difference between the "mental" skills and the motor skills. The latter are tied much more intimately to the maturation process. To consider language once more. Many do learn new languages despite being adults. But how many adults can learn to speak the new language without a foreign accent, i.e., the accent of a mother tongue learned in childhood. The motor skills involved in language are set relatively early in life. Dancing is another example. Many children dance "naturally." They take to it and master it like a duck takes to and masters water. How many adults can master dancing with ease, if at all, if they had had no experience with it as children?

Naive psychology, customarily referred to as "common sense" recognizes this uniqueness of skill learning. English reserves a special word to denote the learning of skills: the word is "training."

IV. ACQUIRING KNOWLEDGE

"Acquiring knowledge" can be rephrased without any essential loss of meaning to "learning things" just as "learning to do things" has already been functionally rephrased in the preceding section to "acquiring skills." The reason the two processes were described in dissimilar words rather than in similar words was to stress the differences between the processes. The use of similar words may tend to establish a set that the processes are basically similar albeit different in some aspects. This set would hurt communication. It will be contended here that the two processes seem to be logically complementary; that the opposite of what characterizes the one characterizes the other. But first it may be profitable to discuss briefly what is meant by "acquiring knowledge" in general terms.

Naive psychology also recognizes the uniqueness of this process by assigning a special word to denote it -- "education." The sentence: "The pugilist is being educated," conveys a different meaning than the sentence: "The pugilist is being trained." The words "education" and "knowledge" refer to our awareness of the world, its nature, its causal texture, its meaning.

It is this awareness which results as the end-product of the process of acquring knowledge, so real yet so impalpable, so easy to see, yet so difficult to describe, that has served as the model for some psychologists in formulating concepts as "apperceptive mass," "cognitive map," "schema," and/or "frame of reference."

Knowledge and understanding imply each other, hence from a logical standpoint at least, they are equivalent. A body of knowledge is not an aggregate of isolated facts, idiot savants have shown remarkable ability in amassing such aggregates; it is some sort of integrated, interdependent, differentiated

unity in which every element has a necessary place by virtue of the totality in which it is embedded. Piaget's concept of the adult logical matrice, although perhaps too simple, is nevertheless a good concrete model of what such an entity as knowledge might be.

The fact that knowledge is so difficult to describe or to define in words does not mean that it is difficult to see. Take so simple a phenomenon as fear. No verbal description is really adequate to describe it, yet the talented actor will be able to present a picture on the stage so that every individual in the audience will perceive fear as clearly as he can perceive a black square painted upon a white background. There are some who are dissatisfied with this state of affairs and devote much of their energy to a verbal and/or conceptual analysis of this tantalizing phenomenon. Attempts in this direction seem to end up in amputated, truncated pictures that are poor caricatures of the real thing. The genius who will successfully accomplish this task has yet to arrive. Nevertheless, since the phenomenon is perceptually clear to all those who are not solipsists of one form or another, one can still talk meaningfully about how this state is attained.

The acquisition of knowledge is not a process characterizable by the addition of small increments. On the contrary, it proceeds by means of noticeably discontinuous large steps. Naive psychology discriminates: "Either one knows or one does not know." This discrimination does not refer to skills, it refers to knowledge. Take reading a book as an example. One does not read it over and over again until it is mastered. To be <u>known</u>, a book generally has to be read only once. Sometimes, a difficult book is read several times in order to be <u>understood</u>. But this is quite dissimilar to the process leading to a skill acquisition. Understanding is achieved by one or a series of noticeable discontinuities as the person proceeds from darkness into light.

Although it need not be the only way to knowledge, the phenomenon of insight, the "aha" experience, always indicates that a change in knowledge has taken place.

Take the basic element of knowledge, the fact or datum, be it an object or relationship between objects. It permits only to a discontinuity. Either it is perceived or it is not perceived. Knowledge grows from a body of discontinuous facts, through successive stages of discontinuous organizations and reorganizations, until it reaches a reasonable comprehensively integrated end-state.

The acquisition of skills has been characterized by increasing automatization and recession from consciousness. Exactly the opposite must hold for knowledge. The essence of knowledge is that which is required emerges into consciousness where it is thought about to see how it fits the situation for which it is considered. If the constitutents of knowledge were automatized they would appear machine-like every time a "button were pressed." How could they then be applied to the manifold situations in which knowledge plays a role. In planning how to achieve a goal, man uses his knowledge and intelligence to break up the task into a series of standardized procedures so that his automatized skills can then take over.

"Unconscious" knowledge seems to be even more of a contradiction. What is one of the stock phrases a person utters when he embarks upon a chain of thought in attempting to solve a problem? Isn't it: "Now let me see."

Skills were said to be related to means for goal attainment; knowledge is the basis for the rational component in goal setting, and is almost solely responsible in determining the means to be taken to achieve the goal. Skills were characterized as lying dormant in isolation, taking part in behavior only when needed. The elements of knowledge, being parts of an integrated

unity are certainly not isolated. They are not dormant. Any and every reorganization of the body of knowledge affects all of its elements by virtue of the fact that every element has to fit into the new organization.

However, since the whole body of knowledge does not emerge into consciousness at once, since only those elements of knowledge relevant to the existing situation seem to appear, it may be argued that in this respect knowledge is similar to skills. The argument can be countered by means of an analogy. The eye, as a mechanical optical instrument, brings into focus an undifferentiated veridical picture of the visual field upon the retina. From a mechanical standpoint the picture on the retina is a distribution of point stimulations on a two-dimensional plane. This plane by itself is a mosaic; it contains no objects, no things, no depth, etc. Yet, somewhere along the line, this plane is organized into a world of objects and spaces. Even more so, we can attend to first one object, then another and another without any change in the visual field. Research in vision has established that the figure is dependent upon the ground, i.e., changes in the ground will affect the perception of the figure. A similar model can be postulated for the organized body of knowledge. While it is true that at any given instant a figure from that body is in consciousness, nevertheless, the rest of the body acts as a dynamic ground for it. We never can perceive all the details of our knowledge at one time just as we can never perceive all the details of the visual field at one time.

In some respects, although not in all, knowledge is also related differently to age and maturation than are skills. (Notice parenthetically that we do not speak of "knowledges" as we do of "skills." This is a recognition by naive psychology that knowledge is a unity.) In some respects it is true to say that the real job of acquiring knowledge begins once adulthood has been

reached and the basic repertoire of skills are acquired. There are certainly many adults who will readily admit that they are too old to learn new skills but will most vehemently deny that they are too old to learn. If we study human societies, both primitive and non-primitive, we would find upon excluding cases of senility, a very high correlation between socially recognized knowledgeable people and their age.

Skills and knowledge are closely related. The acquisition of skills affects the acquisition of knowledge; the acquisition of knowledge affects the acquisition of skills. Knowledge affects the application of skills, skills affect the application of knowledge. How?

Knowledge is conceived as a unified whole which determines the meaningful world in which the individual lives. It is a function both of the integrating ability of the individual, an ability which probably served as a model for the concept of "intelligence," and individual experience. Intelligence is not germane to the present discussion and need not be considered. The effects of experience upon the acquisition of knowledge is quite germane. The acquisition of skills, by increasing the repertoire of means at the individual's disposal, increases his mobility, increases the number and wealth of his experiences, and this in turn affects the body of knowledge at the individual's disposal. Hence, the acquisition of skills affects the acquisition of knowledge.

Knowledge, in turn, will affect the acquisition of skills in two ways. First it acts as a motivating agent. When one knows about a thing, one may become interested in that thing, and then try to do it. Certainly, it is impossible to get interested in a thing unless that thing is part of a person's knowledge. For instance, reading a book about sailing can get the

reader interested in sailing which will then motivate him to master the skills involved in sailing. But knowledge affects the learning of skills in a more subtle and important way. It seems to be true that a person will learn a skill more efficiently when the meaning of the skill is clear to him than when it is not. Knowledge is the repository of meaning.

Similar arguments can be given for the effect of skills upon knowledge.

Yet knowledge and skills are independent of each other, i.e., one can exist without the other. Or, to hedge somewhat, one can exist with very little of the other. Idiot savants have already been mentioned. They are examples of skills without knowledge. The other extreme is the absent-minded professor of physics who cannot fix an electrical connection; knowledge that is almost helpless because of the lack of skills. But these extremes, if they exist at all, are beyond the ken of most people. It may, therefore, be worthwhile to discuss in somewhat greater detail an example that is commonplace--the multiplication table.

One of the main forces that led to the modern Dewey revolution in education was the realization that a child may have perfect mastery of the multiplication table and yet not have the faintest idea of what multiplication is. This results in an inability to generalize or to multiply sets of numbers that are not found in the table. The slogan became that the child should not be taught blind skills, but should be taught to understand. In fact, teaching blind skills has become somewhat of an anathema. Some of the excesses of "modern" education produced a pupil who understood multiplication perfectly but had no skill with the multiplication table. This pupil understood that 8 x 7 means adding seven to itself eight times or adding eight to itself seven times. Given a problem in the multiplication

of digits he would do precisely that and come out with the correct answer. He also understood that the principle of successive addition also held for the multiplication of a three-digit number by a three-digit number. But lacking the algorithm based on the multiplication table on one hand, and lacking enough paper and patience on the other, he found that he could not solve the latter problem of multiplication.

Before leaving this discussion on knowledge, it is interesting to consider one more of its aspects. It has been mentioned several times that knowledge constitutes an organized body. But this understates the case. The person abhors discontinuities and disorganization within his body of knowledge. Each event and each experience that does not fit, becomes a personal challenge to the individual. He struggles with it until it fits somehow. If he is unsuccessful in this, the event becomes unpleasant per se and he avoids facing it. It is in these cases, when reason fails, that rationalization and then repression step in. Two very interesting fruits of this requirement of total organization are religion and philosophy; both are characterized as yielding, in the case of philosophy "seeking" would be a better word, ultimate answers. Theologians and philosophers are objects of extreme social respect in almost all societies because they represent the prime forces acting for the elimination of discontinuities of meaning, for the ultimate integration of all knowledge.

The conflict between science on one hand and theology and metaphysics on the other can be seen in a slightly different perspective in light of the above consideration. Scientific explanation does not oppose theological and metaphysical explanation, it obviates it.

V. LEARNING TO GET ALONG WITH PEOPLE OR IN GROUPS

This process concerns what is generally subsumed under the rubric: Social learning. However, it is not differentiated from "thing learning" as "social perception" is differentiated from "thing perception". In perception, the differences between the world of thing events and the world of social events is on the surface, stands out (4). It is the commonalities that have to be sought out, that have to be elucidated. In learning the opposite seems to hold. That which is common to thing learning and social learning stands out and we consequently neglect many differences. Skills and knowledge are involved in social learning just as they are involved in maturational learning, but, as with maturational learning, the context in which they are involved is different enough to merit separate discussion.

Since learning is intimately related to perception, it may be profitable to start this topic by reviewing some of the differences between social and thing perception. The first difference which seems to stand out is the fact that social perception is mediated by thing perception. This means that the perceiver can perceive the mediating processes in social perception. This condition does not exist in thing perception. One does not see the perturbations in the light rays which mediate vision nor the perturbations in the atmosphere which mediate autition; one sees the things and one hears the sound per se. Brunswik (1) points out, in discussing his lens model of perception and behavior, that both in perception and in action, little if any clear relation exists between the processes mediating perception and action and the perceived objects and nature of action per se. Luckily for thing perception the mediating processes are invisible. They can be made visible by means of electronic equipment but anyone who has

seen sound or heard a television picture knows that these stimuli are meaningless as far as hearing and seeing the event represented is concerned. The matter is different for social perception. There the discrimination between the invariant stable social events that ought to be perceived and the thing events that mediate these perceptions is not always easy. This has been complicated by the fact that many philosophers have postulated that only thing events are "real". They in turn influenced many scientists who directed their research along this way. Hence the problem of variant mediation of invariant social processes was not easily recognized.

A second difference between thing and social perception is the difference in their causal textures, their causal nexi. Michotte (5) has demonstrated that when points of light move in a manner such that their future movement is a simple immediate extrapolation from their present and past movement, they are perceived as being thing events, i.e., mechanical, non-living. However, when this is not the case, when non-extrapolatable changes in velocity and/or direction take place, the movement is perceived as being animate. Mechanical, thing movement appears as determined once the initial position and velocity are perceived. When this phenomenal determinism disappears, leving processes are then seen. This is the perceptual basis for the concept of "free will". The perception of a moving thing almost instantaneously tells you where it is going to, the perception of a moving man or animal does not.

It can therefore be asserted that social perception is much less accurate than is thing perception. Confusion can and does arise, and in addition, it is much more difficult for an individual to correct for confusion in social perception. Under such conditions learning is much more difficult too, in fact, under many conditions the difficulties become so

great that the person defensively reverts to skills and knowledges of the thing world which are successful in their realm and applies them in desperation, blindly, to the social world. This leads to trouble.

The lack of accuracy in social perception is greatly complicated by the fact that the social environment affects the individual in several striking ways in a manner not found in the thing environment. The social environment is perceived as having powers to change a person, which, except under extreme conditions, the thing environment is not perceived to possess. This special power of the social environment stems, not surprisingly, from the fact that the person has commerce with a living organism rather than with an inanimate thing. But not any living organism under any circumstances will do; it has to be a conscious, intelligent organism with the ability to perceive the person. Under these circumstances the person experiences a sort of self-consciousness which is lacking in all other environments.

Conscious awareness and ability to perceive on the part of an intelligent organism are necessary and sufficient conditions to evoke this self-consciousness. The fact that a person can use the knowledge he acquires by seeing another against that other, aggravates the feeling of self-consciousness. But this is not necessary. Two examples. People who have pets can attest to a fairly common experience. It occurs when looking into the eyes of the pet. Under these circumstances one can suddenly get the feeling that the pet understands the person; concomitantly a feeling of self-consciousness emerges. Similarly, consider the circumstances where a person sits by himself in some public place or conveyance. A second person enters, a stranger who will soon leave never to be met with again. The stranger sits down behind the person. Who can avoid a strong feeling of self-consciousness in such a situation?

This self-consciousness entails, among possible others, two strong irrational components; one wants the other to think well of him, and one has the feeling that one's thoughts and perceptions are open to the other. This has a host of effects on the person involved of which only one will be discussed explicitly. In social conditions it is much more difficult for an individual to appraise himself objectively. He finds it difficult to admit, if only to his innermost self, that he is in error. Rationalizations, that is, reasons attributing the inadequacies to any source but to himself tend to overwhelm him. Any learning which depends upon recognition and elimination of error cannot but progress very slowly. In addition, the pressure to conform in areas where there is no question of error increases greatly. If a person or a group make their opinions known, and if one has the feeling, no matter how irrational he recognizes that feeling to be, that the person or group is aware of his private different opinions, the pressure for conformity becomes very great. Conformity can then occur without necessarily introducing a permanent change. When such a person leaves the group or other persons, he will generally revert to his previous way of thinking without great difficulty.

Here, as in many other instances, the dynamics of events involving living organisms exhibit a complexity far greater than the events involving inanimate things.

The defensive attitudes and consequent rationalizations evoked by the presenee of another person add to the difficulty of clear perception in social situations. One can "escape" by attending to the things mediating processes rather than on the relevant social process. Since mediating processes, by virtue of being mediators, can refer back to various different events, something can be perceived which has nothing to do with reality but

which is quite satisfying to the perceiver. The defensive attitudes also oppose a clear thinking-through of social issues so that the organized body of social knowledge can become, and actually is to a varying degree for all persons, autistic and not amenable to correction and change. For instance, the social world is populated with good and bad people, something unheard of in the physical world except when it is anthropomorphized.

One can still recognize and discriminate between skills and knowledge in social learning, but they are changed, both as far as their nature per se is concerned, and in their interrelationships. The previous paragraph indicated somewhat how knowledge changes where social learning is concerned. One of the most striking changes in skills is relatively incomplete automatization. The most skillful group leader cannot exercise his skills in a manner comparable to an expert machine operator. Once he permits them to recede from consciousness he cannot apply them. In addition, the relative independence of skills and knowledge is greatly weakened. There are no idiot savants in this area. In addition, when an erudite professor is met who is supposedly a repository of much of what is known concerning human behavior, and the professor exhibits little skill in getting along with people, an unescapable doubt will always arise as to what he really does know. In order to have skills in human relations knowledge seems to be pre-supposed, and vice versa.

The acquisition of knowledge and skills in the social sphere is also somewhat different. Although formal courses in both are given in institutions of learning and at special seminars, the efficacy of these courses is still to be proven. More than in any other field of learning, we learn to get along with others by trying to get along with others. And this latter, intuitive learning does not come with difficulty. Man does learn to get along

with his fellow man reasonably well, all things considered. In fact, it is paradoxical that the persons with the most profound penetrating insight into the nature of man are not trained and educated psychologists, but self-educated playwrights and authors. Potential Einsteins and Newtons, however, will never achieve eminence unless they receive a thorough formal education in their respective disciplines.

Men do learn to get along with each other and there are techniques that are effective in speeding up this learning and/or making it more effective. The sine qua non of learning to get along seems to be face-to-face interaction with others. In such an interaction the whole response of the individual to an action is perceived as well as the total action of a person towards another. All this evidence, this totality of cues, seems necessary to enable a person to integrate a body of knowledge about another in order to efficiently apply his repertoire of interpersonal skills in dealing with him. To the extent that the evidence is reduced, to that extent learning is hampered.

Of the different learning processes discussed here, social learning is by far the least clear perceptually, the most mysterious conceptually.

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